

Reuling (Geo)

A POPULAR LECTURE

ON SOME OF THE MOST FREQUENT

EYE DISEASES,

DELIVERED BEFORE

ST. GEORGE'S GUILD, OF BALTIMORE,

BY

DR. GEORGE REULING,

Surgeon to Maryland Eye and Ear Institute.

BALTIMORE:

STEAM PRESS OF F. A. HANZSCHE, 22½ SOUTH CHARLES STREET.

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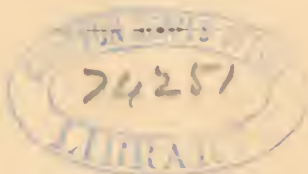
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By GEORGE REULING, M. D.

HERE is a German saying which well expresses the vast importance of vision ; it is : "A blind man—a poor man." This proverb shows the sympathy felt by the masses for one deprived of sight—and well may we pity the poor unfortunate thus afflicted ! But it is not alone the utterly blind that should awaken sympathy ; those suffering of any of the many ailments to which the eye is subjected are all fit objects of our compassion. For of all the senses, there is none so noble as sight ; by its instrumentality we perceive the glorious display of ever-shifting Nature,—revel in the wonder and the gorgeousness of color,—behold the birth-giving earth and the magnificence of the heavens, and thus first learn to compass the Infinity of God, as far at least as our limited natures will admit.

The fact is doubly horrible to think of, therefore, that the majority of people abuse their eyes and often lose vision entirely, because of their total ignorance of the diseases to which this most subtle portion of the body is subject ; even persons possessing a considerable fund of general information entertain exceedingly hazy ideas concerning the eye, its formation, functions and its diseases.

After taking this fact into consideration, I have been led to speak to you this evening, ladies and gentlemen, about some of the most frequent eye-affections. Before entering upon my subject proper, however, I shall briefly rehearse to you the history of ophthalmology, in order to show the vast strides the science has made, vaster and more satisfactory progress, indeed, than any other branch of operative surgery.

The first oculists are to be sought for among the Egyptians. The natural position of their country and its climate, their mode of life, and especially the repeated inundations caused by the overflowing of the Nile, brought on most stubborn diseases of the eye ; diseases which have been preserved in that country, in all their native purity, or rather in all their native *impurity*, for centuries upon centuries, and are to be met with, there, even in our day. This may have caused the Egyptians to direct their attention to ophthalmology and to devote themselves to it as a specialty,—certain it is, that they were the first who made it a study, and they instituted a school of ophthalmology, known in history as the school of Alexandria.

The Greeks, great in all things, were also pre-eminent in this science ; Hippocrates, the father of medicine, wrote about eye-affections, and treated them rationally, and Celsus and Galen published comprehensive and learned treatises concerning them. The Arabs also cultivated this science, but with the downfall of Arabian surgery, ophthalmology also succumbed, until it died a natural, or rather unnatural, death in the gloom of the Middle Ages. It was not until the eighteenth century, that some attention was again directed to it ; and it was reserved for Germany to conduct it to a height which it had never before known. Richter in Dresden, and Baer and Jaeger in Vienna, illuminated the science with an imperishable lustre, whilst Helmholtz, of Berlin, about twenty years ago, by the discovery of the ophthalmoscope enabled us to observe the internal structures of the eyeball and their diseased condition, thus widening a hundred thousand-fold the field of ophthalmology, and giving into our hands the means of noting and controlling diseases which before were hidden from view like the contents of a sealed book. The greatest mind that ever devoted itself to the study of the eye and its diseases, however, was Von Graefe, whose genius consecrated the science and made it replete with results the most beneficial, perhaps, in the entire range of surgery. It will thus be observed, that ophthalmology is essentially a *German* science.

Most people proceed as if they expected to obtain wisdom as Abu Zeid al Hapan declares some Chinese philosophers thought oysters got their pearls, that is, by

gaping; had Graefe, Ammon, Arlt, Jaeger and the best of other men of science thought so as well, blindness were now more common than it is, and many diseases which are remediable, thanks to their labors, would still be without a remedy.

Invention is like fire which must be kindled by some external agent, but which will afterwards propagate itself; so it was with this science, and now there is none better or more exactly known by men who have arduously and zealously made it a study.

It were well now to speak in brief of the structure and the functions of the eye. I therefore come to the second part of my lecture. The eye is a globe thus presenting the greatest resistance to external violence and allowing of free and unrestrained motion. It is enveloped by a white membrane which we call the sclerotic coat, in the front of which is a perfectly transparent structure, the *cornea*, the so-called *watch-glass* cover of the eye, which allows light to enter. The second coat is known as the choroid; in it are the nerves and the blood-vessels. The internal lining membrane is called the *retina*, upon which are portrayed the images of the lining, being thence carried to the brain. The eyeball being an optical instrument, like a microscope, it is evident that a lens is required; this it has in that most perfect one, known as the crystalline lens. The aqueous humor and the vitreous or glassy body serve to give shape and form to the globe of the eye and to keep the nervous tissue in a gentle but steady expansion. They also assist in refracting the rays of light as they enter through the pupil which expands and contracts according to the amount of light which is admitted. This is a wise provision of nature, for by the contraction of the pupil the retina is protected from injury resulting from any too great glare; and the pupil expanding, a larger and more distinct image is formed, so that we are enabled to see better and more clearly.

The eye, moreover, possesses the wonderful power of regulating itself. We can see in the great distance and then, immediately, without any effort, decipher the minute device upon a seal-ring. This power of self-regulation is caused by a little muscle, known as the ciliary muscle, which, pressing on the crystalline lens, causes it to grow more convex, thus increasing its power; we are by this means enabled to "gaze from earth to heaven," and then to discover the myriads of animalcula in a drop of water or the number of fibres contained in the stalk of a flower. Now, if the eye cannot see distant objects clearly and distinctly, or if small objects, when they are held at proper distance from the eye, cannot be observed plainly, this remarkably delicate power of self-adaptation is impaired, or there is some disease of the internal parts, or the construction of the eyeball itself is of a nature deviating from its normal form.

Sometimes the ball is too flat; therefore the rays of light which enter through the pupil are not brought to a focus as they ought to—upon the retina, but *behind* it. This condition is known as—Oversight, or *Hypermetropia*. When it is present, great pain is often caused the eyes, if no correcting glasses are worn; even children, six or seven years old, sometimes require them in order to do away with a great annoyance. The want of care on the part of parents in not attending to their children's eyes, in this particular; in not immediately consulting an oculist, often produces unfortunate results, inasmuch as the majority of cases of "cross-eyes" is caused by this condition. There are six muscles attached to the eyeball, governing its various motions. Now, the muscles which turn the eyes inward—the so-called internal recti muscles—the use of which I shall presently explain to you—in the attempt to increase the visual power of the eyes turn them towards the nose; but being excessively employed and almost constantly brought into play—not only for near objects, but, in this condition, also for the observation of those at a distance—they gradually turn the eyes into that permanent position and an internal or convergent squint, or what is known as "cross eye," is produced. It will be seen, therefore, that the condition of *oversight* is one of vast importance and should not be neglected: competent advice should be obtained, no attention being given to those well-meaning friends, of which every family has a number, who advise delay, and without knowing anything of the subject, recommend all sorts of washes and quack medicines.

Myopia, or "nearsight," is the opposite condition to the one I have just now glanced at. In it the ball of the eye is not too flat, but on the contrary it is unduly elongated, assuming the shape of an egg instead of being round. Rays of light coming from a distance do not come to a focus upon the retina, as in normally-shaped eyes, nor *behind* it, as in eyes affected with oversight, but in *front* of

the retina. In such a condition, concave glasses are required; it is, however, of the utmost importance that these be selected by a competent person, as an improper glass often does an immense deal of mischief. It is a popular fallacy, by the way, that near-sighted eyes are stronger than any other, there is nothing more remote from the truth than this belief. *Myopia* is, on the contrary, most dangerous at times, the internal structures of such eyes occasionally undergoing the most alarming changes. The ophthalmoscope which consists of a plane mirror perforated in the centre, and a convex lens, and which, as I have said, was discovered by Helmholtz and simplified and perfected by Liebreich has unclosed to us the various alterations the internal eye undergoes in the high degrees of near-sightedness. The retina gradually gives away as well as the optic nerve, the choroid and the sclerotic—a bulging is thereby formed, which is known by the name of *posterior staphyloma*. At times, the retina separates from the choroid in consequence, causing destruction of sight. Such fearful results are luckily not always the accompaniment of near-sightedness; their enumeration, however, will convince every one that skillful advice should be sought for in all cases. It were well also to draw the attention of teachers to the fact, that near-sighted children should be required to do as little as possible of work requiring close application; books badly printed should not be given them for study, and they should always be made to sit erect and not be allowed to lean over at their work, nor to read while lying down, as on a sofa, as this causes a rush of blood into the eyes and incites to those consequences I have but now enumerated.

It will be seen from these remarks, that *Myopia* is not only a condition of the eyes, but that it is in its higher stages, often a disease.

I come now to another abnormal condition of the eye which is called *astigmatism*. The cornea, the clear, transparent part of the sclerotic which covers the pupil and the iris as a crystal covers a watch, allows the rays of light to enter the eye without any deviation in perfectly normal eyes. Occasionally it happens, however, that the cornea is curved more decidedly in one or the other direction; for instance, more so from above downwards, than in the direction from the nose to the temple. The consequence of this condition is clear to every intelligent person; rays of light emanating from a body which penetrate the cornea in the vertical diameter, are brought to a focus sooner than those which pass through the cornea in the horizontal diameter. Certain lines are often seen more distinctly than others by persons having this defect; thus vertical lines may appear clear, whereas horizontal lines are blurred or *vice versa*; this is accounted for by the reasons I have given. If this condition be not attended to, difficulty of sight and pain result, especially if the eye is much used. *Astigmatism* may be either present in an otherwise normal eye, or in a near-sighted or over-sighted one. Cylindrical glasses should be worn, and these again ought to be selected by a scientific oculist.

There is a term employed in ophthalmology known as the *accommodation of the eye*: by this is meant the power the eye has in adapting itself from distant to near objects. I have already explained to you the action of the ciliary muscle upon the crystalline lens, which, in the observation of near objects, increases its convexity. There is also another factor at work in the process of the accommodation. This consists in the action of certain muscles which turn the eyeballs towards each other, so that rays of light which diverge may enter the eye, not obliquely, but in the direction of what is known as its axis, which is an imaginary straight line passing from the centre of the cornea to the centre of the retina. When we look at distant objects, the rays of light enter our eyes in a parallel direction, and we therefore do not exert the power of the accommodation; when looking at near objects, the rays of light *diverge* and we therefore draw into requisition this wonderful mechanism. This power is gradually more and more weakened from and after the forty-fifth year; we then notice what is so well-known as old sight. This is caused by the lens becoming harder as age advances, so that the little muscle, the ciliary muscle which you know of, can no longer cause it to become more convex, therefore rays coming from near objects, that is, divergent rays, are not concentrated, this may indeed be *enforced*, but the consequent great fatigue causes one soon to desist from the effort. Anything which lessens the divergence of the rays of light will act as a remedy in this condition, which is scientifically designated as *presbyopia*; and since the only thing known to do this is a convex glass, this should be worn. Sometimes the other factor engaged in process of the accommodation may be affected. The muscles which turn the eyes

towards the nose may act too feebly, and in consequence of the strain they are subjected to in attempting to move in their accustomed direction and to maintain their usual action, they may cause dizziness, pain in the eyes and forehead, and occasionally may give rise to nausea. In such cases, prismatic glasses oftentimes remedy the affection; or it may be necessary to cut the tendon of one of the muscles.

Having briefly spoken of the normal eye and its variations within physiological limits—always excepting the changes occurring in the advanced stages of near-sightedness, for these constitute a *disease* and no longer a *condition*—I shall now, ladies and gentlemen, with your permission, turn my attention to some of the common diseases and accidents to which the eye is exposed.

Eye diseases are promoted and increased, even occasionally called forth, by the artificial light our eyes are subjected to. Since Newton's time we know, that sunlight is composed of rays consisting of various colors. By means of a prism he divided a ray of the sun into seven different colors: red, orange, yellow, green, blue, indigo and violet. Upon reversing his experiment, he discovered that he could reunite all these colors into one, namely, white, uncolored or natural light. There are really three fundamental colors: red, yellow and blue. In ordinary daylight, these rays are mingled in the following proportion, taking 16 as the whole number; red 5, yellow 3, and blue 8. If this proportion be changed, as, for instance, in artificial light, the illumination is not clear, not *white*, but colored. In lamp and more especially in gas-light, the red or yellow rays prevail, and consequently an orange or yellow appearance is given to the flame.

I may here mention a fact which, perhaps, has never struck you before, and which can be explained by what I have just said. If you look at the pavement in the vicinity of a street lamp, when the moon is brightly shining, you will find that this portion of the pavement appears red, while the part illuminated by the moon looks white, that is, appears in the natural and not the artificial color. For this reason, also, crochet-work with lively colors ought not to be undertaken at night, nor in fact any employment at variously colored stuffs. Using the eyes greatly in an artificial illumination leads to ill results because through constant exposure to the yellow and red rays which predominate in artificial light, the eyes become almost entirely unimpressed by these colors, and in consequence, during the day, especially if the gaze be directed upon white surfaces, dark blue or black spots or clouds hover before the sight, causing unspeakable annoyance. I have gone somewhat deeper into the subject of artificial illumination than I had at first intended, but this subject is one of vast importance so far as disease of the eyes is concerned. In order to bring the ill results of artificial light, as regards its color and its effect upon vision, to a minimum, bluish tinted glasses may be worn. Argand burners are most desirable if gas is used, as they can graduate the intensity of the light; the German student lamps are, however, to be preferred, giving a mellow and gentle illumination.

The condition of the atmosphere in which we move is of great importance to the eyes. Dust, smoke, rotting substances and effluvia of all kinds irritate and inflame the eye; or the atmosphere may injure the eye in the shape of a draught, as it may any other part of the body. To guard us against the first-mentioned injurious influences, nature has provided us with eyelids; has placed the eye in a well-protected cavity; and has given it eye-brows and lashes; nevertheless, it happens but too often that all these natural contrivances and protectors prove of no avail. This fact is so well known, that I will not detain you by further discussing it; I shall only mention some remedies which should be employed in order to protect ourselves against these injuries, or, at all events, to lessen their evil effects.

Whoever is obliged to expose himself repeatedly to the dust, should often wash his eyes in *cold water*; a pair of "eye-protectors," or smoke-colored goggles should also be worn. These latter will protect one from the danger ensuing upon the entrance into the eyes of foreign bodies, such as splinters of wood, straws, pieces of glass, coal and so on. Should they *have* entered, the eye should not be rubbed, as that only causes the foreign substances to penetrate into the tissues of the eye. The lids ought to be widely opened and kept so by means of the fingers; the gaze should be directed over the shoulder on the side of the affected eye and then quickly to the point of the nose and *vice versa*, or quickly from below upward and down again. Should this simple remedy not suffice, the eye should be immediately washed with cold water; should all this be of no avail, the opinion and advice of a surgeon should be obtained, bearing in mind meanwhile to abstain from rubbing

the eye. It is always better and safer to call to one's aid the skillful surgeon than to "doctor" one's self. To show the importance of consulting an oculist even in such cases, I will mention an instance: Several years ago a gentleman came to my office; he was much emaciated and in very great distress about his left eye with which he could scarcely see anything. Some months previous to my seeing him, he had been travelling throughout the country as an agent and on his return home complained of pain, intolerance of the light, flow of tears and redness of the eyes. He had placed himself under the care of many physicians who treated him for cold and what not. In the course of a very few seconds, I removed the wing of a juniper bug from his cornea, and after the lapse of not many days he was delivered from his anxiety and his suffering.

Parents and teachers ought to make it an especial care to warn their children and pupils from playing with percussion caps, powder, the game called "caddy," and other dangerous pastimes. Some of the most fearful diseases of the eye result from injuries inflicted by these causes, and more especially from those induced by the bursting of percussion caps. Among a variety of similar unfortunate cases, I will mention one of a boy, whose eye was injured while looking at other boys beating with bricks upon percussion caps. A portion of one of these entered the interior of his eye. I had to remove the eye in order to prevent the sound one from becoming affected through sympathy, which is often to be dreaded, especially after injuries. Perhaps the greatest nicety in ophthalmological practice is called for in determining when an injured eye is to be removed and when not, in order to guard against sympathetic trouble in the sound eye.

There are many diseases of the eyes which are contagious, all towels, sponges, eye-cloths, &c., which are used for the affected eye should be carefully kept away from healthy ones, children especially should not be permitted to get hold of them. The most contagious disease of the eye and at the same time, the one which, together with an affection known as blennorrhoea, furnishes the greatest percentage of our blind, is called granular conjunctivitis. The inner surface of the lids may become rough from the formation of what are known as granulations; these may become exceedingly hard. They constantly rub upon the cornea, and consequently this fine, transparent structure becomes opaque instead of being clear. Blood vessels also develop on its surface, it may ulcerate and break through, thus causing the greatest amount of mischief. The first thing to be done in such a case is to have the granulations removed from the lid, for so long as these remain and by their rubbing keep up the cloudiness and opacity, vision only becomes worse and no better. Persons afflicted with this dreadful disease should therefore have it speedily attended to, as it is, as I have said, one of the most frequent causes of blindness known to us. The discharge from eyes so affected is highly contagious, sponges, &c., used in such cases, should be kept away from all healthy eyes.

I come now to another affection of great importance, inflammation in newborn children. In this disease the lids become red and swollen a few days after birth and a creamy, contagious discharge shows itself. The lids swell to such a degree that they project out a considerable distance beyond the eyebrows, closing the eyes completely. When these are opened an inordinate quantity of thick, creamy discharge pours out from between the lids, destroying the cornea, if nothing be done to stop the progress of the disease.

It is of the first importance to keep the eye perfectly clean by washing it every half and indeed every quarter of an hour, so that it may not be exposed to the noxious influence of the discharge, and also that contagion be guarded against. All external applications should be kept away from such eyes; they should only be kept clean and the oculist should be allowed immediately to see the case, since delay is nearly always fatal to the preservation of sight.

The most common affection of the eyes, however, is what is known as "cold" in the eye. It begins with a feeling of itching, as if sand were in the eye, matter is discharged, which causes the lids to stick together during the night, many people are of the opinion that this disease will remedy itself, in this they are often mistaken, however; others again apply all sorts of nostrums without effect. If seen in time it may be speedily relieved. If the eyelashes are affected, if they are matted and stick together by reason of crusts forming on the edges, it is of great importance to remove them every morning by dipping a soft eye sponge or a piece of linen into lukewarm water and gently moistening the parts; the nail of the little finger may be let to grow and all the scales then carefully removed. If this be neglected a very unsightly result will take place, inasmuch as all the lashes will fall out.

There is great danger, ladies and gentlemen, in looking upon every red eye as one affected with conjunctivitis or "cold." The inflammation attacking the cornea, known as *corneitis* or *keratitis*, is attended with redness, besides the characteristic symptoms; inflammation of the iris, the curtain which is stretched across the interior of the eye, is exceedingly common and very dangerous; this also is attended with redness; glaucoma, the most formidable disease, in its effects, of which we know, is also often attended with redness. It will therefore be seen, that it is a matter of the most vital importance to consult an eye-surgeon in cases which appear trivial, perhaps, to the patient and to his friends.

Iritis, or inflammation of the iris, is generally attended with pain which passes along the forehead and down the nose, sometimes even along the whole side of the head above the affected eye; the pain being especially severe at night. Right behind the iris lies the crystalline lens, to which I have already introduced you. Now, in an inflammation of the iris, lymph is thrown out by it. This exuded lymph is sticky like mucilage and may, and often does, cause the iris to adhere to the lens, often completely clogging up the opening of the pupil. If the patient be seen as soon as possible much may be done towards rendering the disease amenable to treatment. The patient must not look into a bright light, nor, indeed use his eyes too much, and if he is of a rheumatic constitution, he should especially hasten to consult his oculist. The other disease to which I just now called your attention is known by the name of *glaucoma*. It may not only be mistaken for a "red" eye by the ignorant, but I have seen physicians, yes, and so-called oculists too, mistake it for cataract and facial neuralgia. In acute attacks the pain is agonizing, the pain is not so much *in* as *around* the eye; stony hardness of the eyeball ensues, which is caused by an increase in the fluids of the eye; the cornea, which in the healthy eye is exquisitely tender, becomes so greatly devoid of sensibility, that if touched with a fine roll of paper it will not feel the irritation. The pupil grows wider than it normally is, and the iris is pushed forwards and becomes thin and shreddy; the lens, on account of the pressure in the eye, may be crowded against the cornea, and may take on a greenish hue.

There is a peculiar symptom, worthy to be remembered by you. It is an appearance as of a rainbow when the patient at night looks at a luminous object, as at the flame of a candle; during the day, it appears to the patient as if his sight was covered by a mist or a white cloud. The most characteristic symptom of this disease is observed by means of the ophthalmoscope; it is a cup-like depression where the optic nerve enters the retina, and a twisted appearance, the so-called "knee," of the blood-vessels and their pulsation.

There is only one remedy for this disease and that consists in cutting out a large piece of the iris. This operation, which was discovered by the immortal Graefe, is perhaps the greatest triumph of modern surgery. Before Graefe's time, all persons suffering with what was then known as "green cataract," or glaucoma, went hopelessly blind. *Now* however, if the disease is not neglected, but seen in its early stages, before degeneration has taken place, the effect of the operation is gratifying in the extreme; the pain, which in some cases amounted to torture, ceases, and sight which has been almost lost, gradually returns.

In conclusion, ladies and gentlemen, I will briefly draw your attention to what is known as *amaurosis*—a name; by the way, which is very unscientific, as it serves to describe a large number of diseases which are not to be classed under one category.

Before the ophthalmoscope, which I here show you, was discovered, nothing of the interior of the eye could be seen, and the term "*amaurosis*" was used to designate every disease affecting the deeper-seated parts of the eye. It was, therefore, that a student at an examination very wittily replied, upon being asked by the professor what "*amaurosis*" was: "It is," said he, "a disease in which neither the doctor nor the patient sees anything." The term *amaurosis* is applied at present only to diseases affecting the optic nerve and to none other. These, if not too far advanced, are not to be considered hopeless: since many eyes are saved daily from blindness which in former times, deprived of the light of modern science, would have gone irreparably blind. It were well to bear in mind, however that excessive smoking and an inordinate use of alcohol often induce this disease.

I cannot part from you this evening, ladies and gentlemen, without saying a few words about that most common of eye-diseases, cataract. It is a popular

error to believe that this means a skin growing over what is called the sight of the eye. Such is not the case. The crystalline lens loses its transparency, becomes cloudy and *cataract* is the result. It is therefore only a haziness of the crystalline lens, and since all the light that enters the eye must pass through this lens before the image can be impressed upon the retina, it follows that when the lens becomes opaque, blindness must ensue. Both eyes are always affected; it may indeed take a longer or a shorter time for the one to become so after a cataract has formed in the other, but eventually it also will succumb to this disease. Cataract is a disease of an age beyond middle life; children may however be born with cataract, and young people may become subject to it. It takes some time for a cataract to become "ripe" as it is called; the time varies greatly in different cases, from a couple of months to a considerable number of years. We consider it to *be* ripe, when the patient has no sight in his eye, except to tell the difference between day and night and to distinguish the motion of a hand. There is scarcely an operation in the whole range of surgery so gratifying in its results as is the operation for cataract. Von Graefe has here again immortalized his name by the discovery of what is called the linear extraction, by means of which myriads of people can now be rendered happy, whilst they run almost no risk and experience little pain indeed, during the operation. Age constitutes no hindrance to the execution of the operation, as I have successfully operated many who had passed their 80th year.

Ladies and gentlemen, I thank you for the attention with which you have listened to my remarks. I have been led to make them by the reflection that whatever conduces to a better understanding of disease is welcome food for the people. A wise man once said, that to "preserve health is a moral and religious duty; for health is the basis of all social virtues; we can be useful only when we are well."

The full appreciation of this truth it was, which impelled me to address you to-night.

